

SEMESTER EXAMINATION, DECEMBER -2022

Course Name: - B.Tech

Semester: - 1st

Paper Name: - Engineering Mechanics

Paper Code:- TES-103

Time - 2 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer.

Max Marks-70

समय- 2 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त-दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए।

अधिकतम अंक-70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries 04 marks. All questions are compulsory.
- Section B- Answer any 2 out of 4 given questions in maximum hundred (150) words. Each question carries 10 marks.
- Section C- Answer any 2 out of 3 given questions in maximum five hundred (250) words. Each question carries 15 marks.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड-अ में प्रत्येक प्रश्न चार अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड-ब में चार प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम डेढ़ सौ (150) शब्दों में दें। प्रत्येक प्रश्न 10 अंक का है।
- खण्ड-स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम ढाई सौ (250) शब्दों में दें। प्रत्येक प्रश्न 15 अंक का है।

Section - A (खण्ड-अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions.

5×4=20

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

- The possible loading in various members of framed structures are
 - Compression or tension
 - Buckling or shear
 - Shear or tension
 - Bending.
- Pick up the incorrect statement from the following :
 - The C.G. of a circle is at its center
 - The C.G. of a triangle is at the intersection of its medians
 - The C.G. of a rectangle is at the inter-section of its diagonals
 - The C.G. of a semicircle is at a distance of $r/2$ from the center
- If a body weighing 100N rests on a plane inclined at 30° to the horizontal , the component parallel to the plane is
 - 50N
 - 86.6N
 - 57.7 N
 - 60 N
- If F is limiting friction , N is normal reaction and R is the resultant of F and N , the angle of limiting friction is
 - angle between F and N
 - angle between F and R

- c) angle between N and R
 d) None of the above
- (v) The moment of inertia of a triangle of base width b and height h about its base is
- $bh^3/36$
 - $bh^3/12$
 - $bh^3/6$
 - $bh^3/3$

Section – B (खण्ड-ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any two of the following questions in maximum 150 words.

10×2=20

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

- (i) (a) Determine the resultant of the system of forces acting on a beam as shown in Fig.1

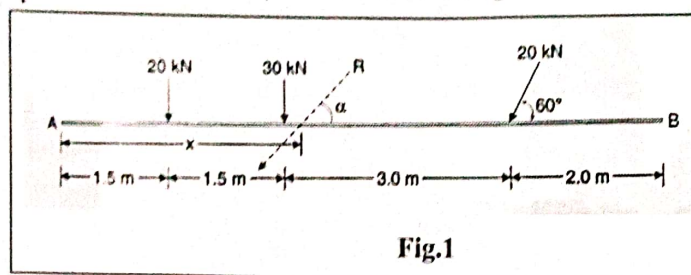


Fig.1

- (b) Explain the behavior of stress-strain curve for the mild steel specimen by describing various points and its practical importance.

- (ii) Find the forces in all the members of the truss shown in Fig.2

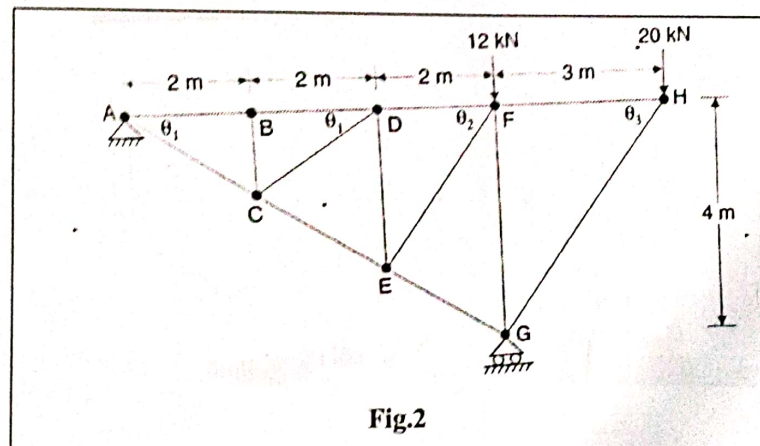


Fig.2

- (iii) (a) A block weighing 500 N just starts moving down a rough inclined plane when supported by a force of 200 N acting parallel to the plane in upward direction. The same block is on the verge of moving up the plane when pulled by a force of 300 N acting parallel to the plane. Find the inclination of the plane and coefficient of the friction between the inclined plane and the block.
- (b) What is framed structure? Define the perfect, deficient and redundant frame.
- (iv) (a) The simply supported beam AB of span 5m is subjected to a concentrated load and external moment as shown in Fig.3. Determine the reaction at B.



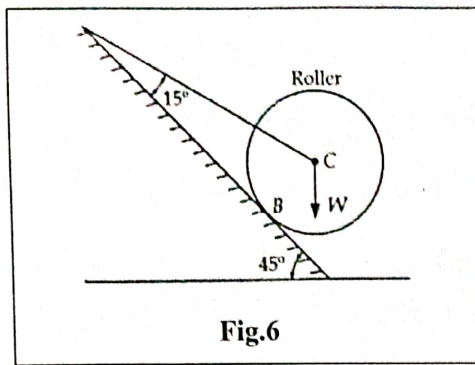
Section – C (खण्ड-स)

3. Answer any two of the following question in maximum 250 words.

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 250 शब्दों में दें।

Fig.5





(b) State and prove triangle law and polygon law of forces.

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